

# THE FARMERS LOCAL KNOWLEDGE TO SUPPORT THE ENVIRONMENT FRIENDLY AGROECOPRENEUR IN SOUTH SULAWESI

Pawennari Hijjang<sup>1</sup>, Mungsi Lampe<sup>2</sup>

<sup>1</sup> Department of Anthropology, Faculty of Social and Political Science Hasanuddin University, Makassar, South Sulawesi, Indonesia email: [aweunhas@yahoo.com](mailto:aweunhas@yahoo.com)

<sup>2</sup> Department of Anthropology, Faculty of Social and Political Science Hasanuddin University, Makassar, South Sulawesi, Indonesia email: [munsilampe257@gmail.com](mailto:munsilampe257@gmail.com)

**ABSTRACT:** *Indonesia has been known as an agricultural country; however, it is ironical that almost all kinds of the staple food has been imported. Therefore, it is deemed necessary to conduct a further research to investigate why such a phenomenon occurs. The issue about the environment damages and the increasing scouring action on the economic resources of the community, such as the increasing production costs and the farming risks as well as the farmers' dependence on the uses of the external input, has made the farmers' expenses greater than the yields they obtained. Hence, this research aimed to describe the farmers' local knowledge, their creativity, which could change the characters into the entrepreneurial pattern of thought. The method used was the qualitative method with the data collection techniques of depth interviews, observations, and focused group discussions. The research result revealed that the local knowledge was applied in all farming activities, starting from determining the season and selecting the seeds up to the post-harvest treatments of the production yields. In order to develop the farmers' agro-ecopreneurship and their environment wisdom, the farmers' local knowledge and creativities should be accumulated, from both the local tradition and the selected external sources, in the conducive situation and condition and actively involving all elements of the stakeholders..*

**Keywords:** *local knowledge, farmers, entrepreneur, wisdom*

## 1. INTRODUCTION

The revitalization of the farms which the government has proclaimed in order to increase the production yields of the farmland by applying the synthetic chemical materials in the short terms may be successful qualitatively. However, in the long terms, such practice needs to be reconsidered because, aside from the quantitative and the qualitative aspects and the fact that the production factors are being scraped, the social, cultural, environmental, and health aspects are in danger. [18] stated that "the commercial industrial technology used at present in farming sector to feed the world population was not *sustainable*". He further argued that especially in the developing countries, this technology is incapable of making those countries independent in providing their populations with food. He also added that aside from losing the nutrition elements and the soil salinity from the irrigation canals, the continuous dependency on the use of the synthetic chemicals are actually not *renewable* and clearly are not *sustainable*. Visilikiotis referred to the Green Revolution movement in the last decades which was characterized by the industrial farming system through the development of the hybrid seedlings using the effective massive input of the chemical fertilizers and poisonous pesticides; the implication of this system was the damages of the environment, such as the loss of the nutrients, the decrease of the soil fertility, the contaminations that occurred in the land surface and water as well as the loss of various types of lives; consequently, the productivity of land decreased sharply [19] [5].

Facing such a problem, the majority of our farmers do submit to their fate when they see various problems and difficulties threatening them. On the contrary, they ever since have shown that they, both as individuals or in a group, are people who always find a way to solve their problems. By applying their traditional knowledge and their selective new knowledge, they adopt and modify their farming technology in order to increase the production and the quality of rice. In this way, the farmers simultaneously accept and benefit from

their new knowledge, and in fact, their knowledge can be implemented by other groups of farmers [6].

Government aware of the negative impact of the implementation of the construction of a top-down encourages the holding of courses Integrated Pest Management (IPM), followed by school kits Field (SL) since the early 1990s in the areas of agricultural center of rice in Indonesia, including South Sulawesi. The program is intended to improve the capability, flexibility, and creativity of farmers in utilizing local and external resources available. Farmers stimulated and taught how to be more creative and independent in running the farm armed with the local knowledge as the basis of reasoning which is supported by the adoption of knowledge from the outside so that they are able to diagnose problems and able to make decisions about the steps anticipated. Farmers are invited to learn and know the kinds of pests and natural enemies of plant pests, so they can control pests in a natural way, cheap, and healthy.

Some research has been done, for example by [15] in Indramayu and Lampung on the effect of Integrated Pest Management Field School (FFS), which has been going for approximately ten years, showing relatively good results in some areas. In this situation the farmers have had organizational skills, the dynamics of the group, and the most important has been the emergence of the ability of initiative and creativity in creating new varieties of crossbred and the discovery of organic fertilizer.

Instead, according [15], became a reality also that farmers in other areas in Indonesia, which also got FFS program with the methods and the same time period, but did not change significantly. If so, then the factors that enable the implementation SLPHT positive effect in some places, being in certain places is not the case? To understand the phenomenon, the study of local knowledge and creativity of farmers who applied in farming technology as well as factors other rice farming in Indonesia, including South Sulawesi.

For the community of rice farmers in South Sulawesi, especially farmers Bugis, Makassar and Toraja, which is a major rice producers in eastern Indonesia, a study on the creativity of farmers is still very rare to do. There is no information elements of local knowledge and yet the identified accurately on the application and utilization of farming technology in South Sulawesi as the potential development of farming technology that supports improved production and quality of rice until now made possible by the scarcity of studies of local knowledge and creativity-innovative farmers in the region. From discussions with some community leaders of farmers in South Sulawesi, obtained information that each farmer communities of ethnic these different little or a lot still use elements of knowledge and traditional technologies specified in his farming operation until now, although they have been involved in the implementation of the Green Revolution of the IPM program with Farmers Field School package. The availability of data is sufficient and accurate information on local knowledge and creativity of farmers of different or the same from any agricultural area into materials for the development of farming technology adaptive, productive, and environmentally friendly, supportive agri-quality rice to the front.

Study of local knowledge and creativity of farmers like this has some important advantages, for both practical and academic interests. From a practical standpoint, these studies look at various issues empirical natural environment, social, cultural and economic reality of peasant communities that change from time to time, whether that comes from within and from outside, the following look at various conditions of potential physical environment- natural and social culture and the local economy and external also been amended from time to time. Local social-cultural potential of accumulated knowledge and technological progress, practices, and creativity - innovative farmers who applied in problem-solving efforts and resource use are assumed to have support for the technological development of agribusiness rice and rice for food security and into the future.

The virtue of academic , that the empirical study like this demanding application and development of theoretical perspectives and empirical models of scientific explanation as well and appropriate research methods. In human ecology (Ecology Anthropology), a model which empirical explanation is putting practices and environmental and economic impacts (positive or negative) in the socio-cultural context of local and external forces that truly bring significant influence on the behavior and consequences. Chronology of bottom-up explanation of the practices and consequences to the top of the socio-cultural (knowledge, values, institutions, and social structures), and the external influences to the outside and not the essential explanation of top-down, less able to see the reality of life of farmers. Although the model is a scientific explanation developed empirical, but a humanist since sided with the potential and interests of local farmers and agricultural stakeholders of society in general.

## 2. METHODOLOGY

The farmers' local knowledge and innovation were documented in the basic form, then presented in the form of the knowledge model which were easily be understood. This was done due to the following reasons: (1) to develop the knowledge potentials and the existing entrepreneurial pattern; (2) to prevent the scouring action of the local knowledge as the result of the development of the more dynamic knowledge.

The approach used in this research was the knowledge-based system [11]. The compilation of the local knowledge was carried out by inventorying the information about the farmers' local knowledge, then documenting it in the form of the *unitary statements*; after that, combining the statements into such a correlation that it showed a description of the local knowledge of the farmers and the local community.

The process of data inventory accompanied by the articulation process of the local knowledge was carried out through depth interviews with the informants about their understanding of the components and functions of the farming ecosystem, farming works, and the interactions that occurred in it.

The data of the farmers' local knowledge were compiled from the results of the interviews with a number of the selected people based on the knowledge they had. The farm management and the supporting entrepreneurial pattern were obtained from a series of interviews with the farmers, both individually and in group, who had direct experiences. The research was conducted in regencies of *Sidenreng Rappang*, *Gowa*, and *Tana Toraja* in South Sulawesi Province.

## 3. DISCUSSION AND ANALYSIS

Indonesia has been known as an agricultural country which is characterized by its farming potentials. For thousands of years until now, the farmers have been known as the producers of knowledge, the innovators, and the primary experimenters in the world of food stuff farming [1] [2]. The rich rice varieties which are planted by the farmer communities of various ethnics around the world, including the Indonesian farmers, have proven their creative-innovative capability, either in the accumulation processes of the elements of their applicative knowledge, or in selecting the rice varieties and in selecting the techniques of planting systems. Various empirical studies about the rice planting phenomenon among the farmer communities have been conducted; among others, by [15] in Subang Regency, West Java and his comparative study on the farmers in Indonesia (Java and Sumatera), Vietnam, and Cambodia; [14]; [13], [10]; [9].

It is assumed that the development and wealth of knowledge , innovative attitude and spirit of creativity variations in the practice of farmers in different places in the world is the result of a process of long experience, inherited from generation to generation, and the adoption of cultural elements farmer from the outside, which takes place continuously, The assumption that culture, particularly the culture of agriculture, not at once, but constantly changing in response to the challenges faced peasant agricultural economy in the context of survival (Struggle for survival). Freedom to experiment and strategies, in the farming

business world has become the basis for the dignity and confidence of the farming community itself [15].

The base of the thought about the processes of creation, knowledge accumulation, and the application of the farming planting technique, particularly the rice culture, can be traced and referred to the perspective of the cultural evolutionism, especially the multi lineal methodology analysis of the evolution by [12], whose study also covered the rice farming evolution in world cultivation centers. During the four phases of the major evolutionist changes of the human civilization (farming innovation, work diversification, central government, and social stratification), which were analyzed by Steward, it appears that the farming innovation was the first in the process of development and was the greatest change in the human civilization. (see [3]). The primary factor in the farming cultural development from the extensification model to intensification model, according to the analysis of the cultural evolutionist, was the well-functioning irrigation system. The reason was that with the irrigation system and the reservoirs, which were among others built by the Sumerians in the old days, the farmers could carry out their farming activities without depending on the climate conditions. It was assumed that through the successful farming efforts, meaning that the food stuff (rice) was available, the communities would be prosperous and could increase the population numbers.

Besides, in the community empowerment program, particularly in Indonesia as an agricultural country, it should be remembered that the Indonesian farming community is a community that has a variety of ethnic groups and cultures. This means that the development which tries to establish uniformity among the various social and cultural units, such as the paradigm of the green revolution, will potentially result in scraping the local institutions, in causing conflicts, and in creating social dependency on the external resources as has happened recently. In order that the above mentioned problems do not happen anymore, the roles of the state and the government should be reduced, and instead the roles of the local communities should be increased [5].

### **The Elements of the Local Knowledge and Creativities of the Farmers**

In the researches which were conducted in the regencies of *Sidrap*, and *Tana Toraja*, it was found that the farmers' knowledge concerning the management of the farms was generally similar to that in other areas. Only some aspects concerning the treatments of the land and the rice crop which were the result of the farmers' creativity. The following is the illustration of the farmers' local knowledge and creativities in each research location.

The empowerment of the farmer communities must be based on the capacity of the farmers themselves, while the external elements are expected to support the farmers themselves and liberate them from any dependency. [7] also stated that in the empowerment program of the farmers, some elements of the local knowledge and creativity of the farmers must be taken into consideration so that the program could give contribution in the form of the quality achievements as follows:

(1) The rice quality which can be seen from the rice physical cylindrical forms, unbroken, clear white and shiny. This characteristic is also the rice quality prescribed by BULOG, as expressed by Yahya (an entrepreneur of a rice mill). Nevertheless, there is still a criterion that should be added to such a standard, namely whether the rice is delicious to eat or not. In the farmers' opinion, the quality rice will be produced when the un-hulled paddy is of the good quality too, i.e. when the un-hulled paddy was heavy, round, solid, and its rendiment was high.

(2) The knowledge about the coming planting season is the starting point of the farming process. For the farmers, the planting season is divided into two seasons, namely *Rendengan* (planted in the rainy season) and *Gadu* (planted in transition season) seasons. The strategy to plant simultaneously is done to anticipate the mice attacks – so that the mice are spread and the effects of their attacks are not very serious. If the rice is not planted simultaneously, some rice plantation will be seriously damaged since the mice prefer the younger plants. Besides, the difference between the two planting seasons is marked by the significantly different production yields. The yields during the *Rendengan* season is generally lower as the result of the fact that the number of pests and insects during this season is greater, while during the *Gadu* season their number tends to decrease; consequently the yields tend to be higher.

(3) The selection of the seeds to raise depends on the farmers' consideration as follows: firstly, the selection of the seeds is based on the previous year experience, whether the seeds has given satisfactory yields or not. Secondly, the desire to obtain delicious rice for daily consumption. Thirdly, whether the seeds are disease and pest resistant. Fourthly, the selected seeds are adaptable with the current season. For instance, the farmers calculate whether it will rain before harvest season – the harvest should be finished before the rainy season, meaning the selected seeds must be the ones with the growing period between the planting and the harvesting period meet the required time. As put forward by an informant, when in the coming planting season it will rain in March, then the farmers should start preparing the land early in November so that the harvest can be done before the rainy season.

(4) The farmers generally use hand tractors to help them plow the wet rice fields. After four or seven days, the soil is spread so that the rice field looks flatter, no more big-sized soil, only mud ready for flattened. The field should be made really flat; because any lower surface filled with water or any higher dry surface are usually pest-sensitive. The use of the planting method is related to the rice field conditions and the treatment given to the rice field lands. This moving planting system has advantage in the rice fields located in the low area and is always flooded, because the planted seedlings can be well adapted. However, from the cost point of view, it is more expensive, because the wages of the workers is 600,000 rupiahs per hectare, beside the time spent between the moment of the process of raising the seedlings and the moment of planting them is 15 days longer compared to the *tabela* method.

(5) The crop care is a further series of a number the treatments of both the land and the paddy crops. The early

phase of the crop treatments is different between the moving planting system and the *tabela* (directly planting the seeds) system. In the moving planting system, the crop treatment is started from the seedling raising period, when the unhusked paddy which is to be raised must be soaked in water for two nights. Then the seeds are drained and put into a container and covered up. After two or three days, white sprouts will appear and seedlings are ready for raising. The same treatments are also given to the seedlings used in *tabela* system. At the moving planting system, the seeds are raised and taken care of for about one month and then moved and planted in the rice fields. While in the *tabela* system, the seedling are directly planted using the planting kits which can be designed so that the number of seedling are spread regularly.

(6) The use of fertilizers is a must for the farmers if they want to get good yields, because they know that the farm soil has become infertile. Thus, the use of fertilizers by the farmers depends on the need, and this matter has already identified by the farmers by only looking at the crop conditions the soil conditions. The need for fertilizers is different in each of the areas, for example, the sandy areas will need a lot of fertilizers compared to the areas where the soil contains more clay and silt. Besides, the crop conditions is one of the factors to be considered by the farmers to determine whether the crops need the fertilizers.

#### **The Environment Friendly Technology in Farming Activities**

The development of the cheap, easy, practical, and valuable technology, which can be internalized by the local communities, will support the improvement of the quality of the production yields. The knowledge about such technology can be obtained from the potentials of the local communities and can be adopted from the external communities. For example, the use of wastes, leaves and fruits, grass, dried stalks, etc. as organic fertilizers in order to reduce the use of chemical fertilizers; the use of pepper, onion leaves, tuba (poisonous plant), surian leaves, chili, and other types plants, which have pungent smells, as pesticides instead of the manufactured pesticides. In order to facilitate this development, the roles of the government are deemed vital, particularly in communicating this knowledge from one region to other regions, from one farmer community to other farmer communities, so that such knowledge and technology can be socialized and applied by the farmer communities and eventually the improvement of the quality of the farmers' rice agribusiness.

The development of the knowledge and the environment friendly, adaptable and productive technology must be carried out while considering that the use of technology like manufactured pesticides, chemical fertilizers, and that that use, either properly or not, can cause damages to the ecosystem and negative impact on human health. For that reason, steps must be taken to institutionalize the local knowledge and to promote the creativity of the farmers in order to make it as reference for other farmers in carrying out the farming activities. It is very important that we identify the elements of that knowledge, technology, and practices which are still be applied by the farmers. And then those elements

are studied scientifically in order to explain them logically, and finally, adopting them as their new knowledge in improving the farming productivity and their prosperity.

To adopt technology in order to make the work in the field easier cannot be accepted just like that. On the contrary, it should be studied first whether such technology is suitable for the rice field area and for the local natural conditions. For example, adopting the tractor technology from China cannot be directly used in the farm areas of South Sulawesi, because such technology should be modified by the farmers before the tractor can be used. Such process and condition is called adaptation process and the sustainability of a knowledge and technology can support the increase of the productivity.

#### **4. CONCLUSION**

The elements of the traditional knowledge, technology and practices are still applied by the farmers because their functions are still considered effective while the new elements which are adopted from outside have been able to take over these main functions. The effectiveness of these functions can only be shown by the testimony of the farmers that with the application of the traditional systems, the farmers can continue their farming activities and earn their main living sources ever since. As for the natural fertilizers, the farmers in the four locations know very well their functions and advantages, though at the application levels the farmers show differences, either in their forms, variations, and frequencies.

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